

Practitioner's Docket No. 1418-40

AP/3618
PATENT *B*

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: HERBAUT, Olivier
Application No.: 0 9/170189 Group No.: 3618
Filed: Oct. 13, 1998 Examiner: Fleming, F.
For: AIR BAG COVER

Assistant Commissioner for Patents
Washington, D.C. 20231

**TRANSMITTAL OF APPEAL BRIEF
(PATENT APPLICATION—37 C.F.R. § 1.192)**

1. Transmitted herewith, in triplicate, is the APPEAL BRIEF in this application, with respect to the Notice of Appeal filed on Sep. 23, 2002

NOTE: "Appellant must, within two months from the date of the notice of appeal under § 1.191 or within the time allowed for reply to the action from which the appeal was taken, if such time is later, file a brief in triplicate. . . ." 37 C.F.R. § 1.192(a) (emphasis added).

2. STATUS OF APPLICANT

This application is on behalf of

☒ other than a small entity.

☐ a small entity.

A statement:

☐ is attached.

☐ was already filed.

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CERTIFICATION UNDER 37 C.F.R. §§ 1.8(a) and 1.10*

(When using Express Mail, the Express Mail label number is mandatory;
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I hereby certify that, on the date shown below, this correspondence is being:

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37 C.F.R. § 1.8(a)

37 C.F.R. § 1.10 *

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Signature *JS*

John S. Egbert

Date: 11-21-02

(type or print name of person certifying)

* Only the date of filing (§ 1.6) will be the date used in a patent term adjustment calculation, although the date on any certificate of mailing or transmission under § 1.8 continues to be taken into account in determining timeliness. See § 1.703(f). Consider "Express Mail Post Office to Addressee" (§ 1.10) or facsimile transmission (§ 1.6(d)) for the reply to be accorded the earliest possible filing date for patent term adjustment calculations.

(Transmittal of Appeal Brief [9-6.1]—page 1 of 3)

3. FEE FOR FILING APPEAL BRIEF

Pursuant to 37 C.F.R. § 1.17(c), the fee for filing the Appeal Brief is:

- | | |
|---|----------|
| <input type="checkbox"/> small entity | \$160.00 |
| <input checked="" type="checkbox"/> other than a small entity | \$320.00 |

Appeal Brief fee due \$ 320

4. EXTENSION OF TERM

NOTE: 37 C.F.R. § 1.704(b) ". . . an applicant shall be deemed to have failed to engage in reasonable efforts to conclude processing or examination of an application for the cumulative total of any periods of time in excess of three months that are taken to reply to any notice or action by the Office making any rejection, objection, argument, or other request, measuring such three-month period from the date the notice or action was mailed or given to the applicant, in which case the period of adjustment set forth in § 1.703 shall be reduced by the number of days, if any, beginning on the day after the date that is three months after the date of mailing or transmission of the Office communication notifying the applicant of the rejection, objection, argument, or other request and ending on the date the reply was filed. The period, or shortened statutory period, for reply that is set in the Office action or notice has no effect on the three-month period set forth in this paragraph."

NOTE: The time periods set forth in 37 C.F.R. § 1.192(a) are subject to the provision of § 1.136 for patent applications. 37 C.F.R. § 1.191(d). See also Notice of November 5, 1985 (1060 O.G. 27).

NOTE: As the two-month period set in § 1.192(a) for filing an appeal brief is not subject to the six-month maximum period specified in 35 U.S.C. § 133, the period for filing an appeal brief may be extended up to seven months. 62 Fed. Reg. 53,131, at 53,156; 1203 O.G. 63, at 84 (Oct. 10, 1997).

The proceedings herein are for a patent application and the provisions of 37 C.F.R. § 1.136 apply.

(complete (a) or (b), as applicable)

- (a) ☐ Applicant petitions for an extension of time under 37 C.F.R. § 1.136 (fees: 37 C.F.R. § 1.17(a)(1)-(5)) for the total number of months checked below:

Extension (months)	Fee for other than small entity	Fee for small entity
<input type="checkbox"/> one month	\$ 110.00	\$ 55.00
<input type="checkbox"/> two months	\$ 400.00	\$ 200.00
<input type="checkbox"/> three months	\$ 920.00	\$ 460.00
<input type="checkbox"/> four months	\$ 1,440.00	\$ 720.00
<input type="checkbox"/> five months	\$ 1,960.00	\$ 980.00

Fee: \$ _____

If an additional extension of time is required, please consider this a petition therefor.

(check and complete the next item, if applicable)

- ☐ An extension for _____ months has already been secured, and the fee paid therefor of \$ _____ is deducted from the total fee due for the total months of extension now requested.

Extension fee due with this request \$ _____

or

- (b) ☒ Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

5. TOTAL FEE DUE

The total fee due is:

Appeal brief fee \$ 320

Extension fee (if any) \$ _____

TOTAL FEE DUE \$ 320

6. FEE PAYMENT

☐ Attached is a ☐ check ☐ money order in the amount of \$ _____

☒ Authorization is hereby made to charge the amount of \$ 320

☐ to Deposit Account No. 08-0879

☒ to Credit card as shown on the attached credit card information authorization form PTO-2038.

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☒ Charge any additional fees required by this paper or credit any overpayment in the manner authorized above.

A duplicate of this paper is attached.

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NOTE: If there is a fee deficiency and there is no authorization to charge an account, additional fees are necessary to cover the additional time consumed in making up the original deficiency. If the maximum six-month period has expired before the deficiency is noted and corrected, the application is held abandoned. In those instances where authorization to charge is included, processing delays are encountered in returning the papers to the PTO Finance Branch in order to apply these charges prior to action on the cases. Authorization to change the deposit account for any fee deficiency should be checked. See the Notice of April 7, 1986, 1065 O.G. 31-33.

☒ If any additional extension and/or fee is required,

AND/OR

☒ If any additional fee for claims is required, charge:

☒ Deposit Account No. 08-0879

☐ Credit card as shown on the attached credit card information authorization form PTO-2038.

WARNING: Credit card information should **not** be included on this form as it may become public.

Date:


SIGNATURE OF PRACTITIONER

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF APPEALS

APPLICANT: Olivier HERBAUT

SERIAL NO.: 09/170,189

ART UNIT: 3618

FILED: October 13, 1998

EXAMINER: Fleming, F.

TITLE: AIR BAG COVER

CERTIFICATE OF MAILING UNDER 37 CFR 1.8(a)

Commissioner of Patents
and Trademarks
Washington, D.C. 20231

Sir:

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APPLICANT'S BRIEF IN SUPPORT OF APPEAL

is being deposited with the United States Postal Service with sufficient postage as first class mail
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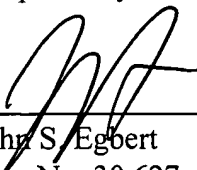
Commissioner of Patents and Trademarks
Washington, D.C. 20231

on November 21, 2002.

Respectfully submitted,

Date

11-21-02



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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
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TITLE: AIR BAG COVER

APPLICANT'S BRIEF IN SUPPORT OF APPEAL

Commissioner of Patents
and Trademarks
Washington, D.C. 20231

Sir:

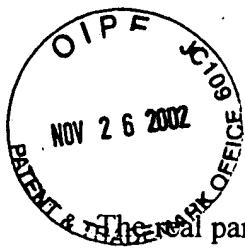
This is an appeal from the Final Rejection of Claims 17 - 22 in the Official Action of May
21, 2002.

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IDENTIFICATION OF REAL PARTY IN INTEREST

The real party in interest in the present application is Plastic Omnium Auto Interior, the Assignee of record of rights in the present application.

RELATED APPEALS AND INTERFERENCES

There are no other related appeals or interferences relative to the present application.

STATUS OF ALL CLAIMS

Originally Claims 1- 10 were filed in this case. An Amendment "B" was filed which canceled Claims 1 -1 0 and substituted Claims 11 - 16 therefor. An Amendment "C" was filed canceling previous Claims 11 - 16 and substituting Claim 17 - 22 therefor. A copy of the claims in this case is attached hereto as Exhibit "A".

STATUS OF ALL AMENDMENTS FILED SUBSEQUENT TO FINAL REJECTION

Applicants filed no Amendment following receipt of the Final Office Action of May 21, 2002. The claims in this case, as appearing prior to the final rejection, are taken up in this Appeal.

CONCISE SUMMARY OF THE INVENTION

The present invention is an air bag assembly for use in a vehicle which includes an air bag that is capable of being inflated from a vehicle bodywork. A body is provided having a first layer and a second layer with the first layer being of a thermoformable synthetic cellular material which rigidifies the body. The body has a first edge and a second edge. A retaining means is provided

for permanent retaining the body to the vehicle bodywork. This retaining means includes a flap of flexible material integrally formed with and extending from the first edge of the body. The flap is permanently affixed to the vehicle bodywork such that the body is in hinged relationship to the vehicle bodywork. A fixing means is provided for releasably fixing the body to the vehicle bodywork. The fixing means serves to release from the vehicle bodywork when the air bag is inflated such that the air bag inflates without tearing the body or the flap of flexible material. This fixing means is secured to the second layer of the body. The fixing means includes a first strip of hook-and-loop material and a second strip of hook-and-loop material complementary to one another and detachably engaged with one another. One of the strips of hook-and-loop material is secured to the body while the other of the strips of hook-and-loop material is secured to the vehicle bodywork.

The use of the integrally attached flap of flexible material extending from the first edge of the body serves to prevent tearing of the body or the flap of material when air bag is inflated.

CONCISE STATEMENT OF ALL ISSUES
PRESENTED FOR REVIEW

In the Final Office Action, Claim 17 - 22 were globally rejected under 35 U.S.C. § 103(a) as being obvious and, hence, unpatentable over the Rhodes, Jr. patent (attached hereto as Exhibit "B"). The central issue on appeal is whether it would have been obvious to one of ordinary skill in the art to utilize a flap of flexible material integrally formed with and extending from the first edge of the body in place of the riveted flap of material secured to the exterior layer of the air bag cover, as taught in the Rhodes, Jr. patent.

In both FIGURES 2 and 3 of the Rhodes patent, there is shown a structure somewhat reminiscent to the structure of the present invention. However, in FIGURE 2, the flap has one end riveted to the vehicle bodywork and another end riveted to an outer skin of the outer layer of material of the air bag cover. FIGURE 3, an alternative embodiment of FIGURE 2, shows a similar structure for securing the flap to the vehicle bodywork and to the cover. The portion of the flap that is secured to the cover is positioned away from an edge of the cover.

**GROUPING OF CLAIMS FOR EACH
GROUND OF REJECTION WHICH APPLICANT CONTESTS**

Claims 17 - 22 should be grouped together since the Final Rejection was addressed to those claims in their entirety based upon the Rhodes, Jr. patent.

ARGUMENTS AND AUTHORITIES

I. THE IMPORTANT DISTINGUISHING FEATURE OF THE PRESENT INVENTION IS THE "FLAP OF FLEXIBLE MATERIAL INTEGRALLY FORMED WITH AND EXTENDING FROM ONE EDGE OF THE BODY."

Applicant respectfully contends that the central issue on Appeal is the issue of whether the "flap of flexible material integrally formed with and extending from one edge of the body" patentably distinguishes the present invention from the prior art Rhodes, Jr. patent. This limitation of the present invention was recited in both independent Claims 17 and 20. The Applicant respectfully contends that this feature is neither shown nor suggested, in any way, in the prior art Rhodes, Jr. patent.

The general importance of this feature is recited in the original specification on page 1,

lines 19 - 29, as follows:

Very often, the covers of these devices are provided with a decorative covering made of synthetic materials (thermoplastic sheets, knitted, woven or non-woven fabric) from a lining piece.

In this case, problems are posed in connections with the tear strength of the decorative material in the weakened zone of the covers. The lining piece then has to be removed completely to enable the retaining device to function.

Complex, costly systems for swinging and retaining the lining piece upon the triggering of the retaining system have thus been developed. Sometimes, even, the proximity of the vehicle occupant precludes the use of such devices, and as a result, one is faced with an impossible situation.

A major problem with the prior art systems is that the covering of the air bag becomes destroyed upon the deployment of the air bag and thus precludes any re-use. The covering of the air bag cover is typically formed of a relatively fragile material that will be destroyed under the violent forces of the air bag. Once the air bag is deployed, an entire replacement of the dash board system would be required. As was stated in the original specification on page 2, lines 4 - 6:

It is found, however, that this solution restricts the choice of materials that can be used. These must, indeed, be tearable. In addition, after triggering, the cover element is destroyed, thus precluding any re-use.

As such, the present invention does provide a cover which avoids the destruction of the cover and allows for the re-use of the cover. This feature was recited in the original specification on page 2, lines 13 - 16 as follows:

Another object of the present invention is to provide a cover for an inflatable bag or cushion type retaining device that is possibly re-usable and that enables the destruction of the cover after the device has been triggered to be avoided.

Importantly, the structure of the present invention, as claimed in independent Claims 17

and 20, provides a structure which allows the cover to the air bag to be re-used and, in addition, avoids the deployment of pieces or projectiles from the cover when the air bag is forcefully deployed. This feature was recited on page 4, lines 17 - 23 as follows:

As the said cover 1 is removably fixed to bodywork 5, it can thus be moved away, in particular in the direction of arrow 20, without either tearing of the said body 2 or damage thereto. If so wished, it can then be re-used.

This being the case, the said retaining means 3 makes it possible to prevent the said cover 1 from becoming a projectile when the said retaining device 6 is triggered by keeping it connected, for example, to the said bodywork 5.

As can be seen from the original specification, it has always been a central feature of the present invention to provide an air bag cover that would allow the air bag to be released, under force, while retaining the integrity of the cover and also the connection of the cover to the vehicle bodywork. This is accomplished by integrally forming a flap so as to extend from the edge of the body. The present invention avoids rivets (which can become projectiles under air bag deployment) or separate flat materials which can become dislodged from the riveting or other connection to the vehicle bodywork. If any tearing of the cover of the present invention should occur under the force of air bag deployment, it is no more likely to occur in the area of the flap than it would be in any other area of the body (because of the integral connection). The edge of the body provides a firm connection point which avoids imparting forces upon the unreinforced central area of the exterior layer of the body.

II. THE RHODES PATENT DOES NOT HAVE SUCH A "FLAP OF FLEXIBLE MATERIAL INTEGRALLY FORMED WITH AND EXTENDING FROM ONE EDGE OF THE BODY."

The Rhodes patent shows a similar technique, to that described in connection with the present invention, of securing the cover of the air bag by a flap to the vehicle bodywork.

FIGURES 2 and 3 shows identical solutions for this manner of attachment. In particular, a separate flap of material has one end riveted to the outer exterior surface of the air bag cover and an opposite end of the flap riveted to the vehicle bodywork. As was recited in column 4, line 43 - 46 of the Rhodes patent:

A tether 33 is secured between the front edge 10c and a retainer 14a on the instrument panel 16 to control upward pivotal movement of the door 10.

Similar, the connecting flap, as shown in FIGURE 3 of the Rhodes patent, was defined in column 5, lines 51 - 56 as follows:

The impact will cause door separation when the air bag impacts on the underside of the door to allow the rear edge 10a of the door assembly to freely release from the instrument panel so that the door assembly 10 will quickly open by pivotal movement about a front hinge flange 60 connected to a retainer on the main pad of the instrument panel.

In fact, as shown in FIGURES 2 and 3 of the Rhodes patent, the end of the flap 33 (or the flap 60) has one end riveted to the thin outer skin of the air bag cover. This skin was described in column 3, lines 56 - 65 of the Rhodes patent as follows:

In accordance with the invention, the door assembly includes a vinyl outer cover 32 which can be formed from cast vinyl material by processes such as those set forth in U.S. Patent. Nos. 4,664,864 and 4,784,911, both commonly assigned to the same assignee as in the present application and incorporated by reference herein. Such outer covers 32 have colors and grain appearances that are accurately matched to the appearance of the surface of an associated interior trim product such as the illustrated instrument panel.

Applicant respectfully contends that the vinyl outer skin of the air bag cover can be easily torn from the riveted connection of the flap when the explosive forces imparted by the air bag are placed upon the underside of the air bag cover. Whenever a tearing occurs between the flap and the outer skin of the air bag cover, various projectiles, such as portions of the flap, portions of the outer skin of the air bag cover, or the rivets can cause damage and harm to the occupants of the vehicle. Furthermore, because of this relatively fragile connection, Applicant respectfully contends that it is likely that the cover in the Rhodes patent could not be re-used in any effective manner. The present invention overcomes these problems by assuring that the flap of flexible material used for the retaining means is integral with the material of the body.

III. THE "THERMOFORMABLE SYNTHETIC CELLULAR MATERIAL" AS THE FIRST LAYER OF THE BODY IS NOT SHOWN IN THE RHODES PATENT.

Although less critical to the functioning of the present invention than that of the integral flap, Applicant feels that it is important to mention that the present invention utilizes a "thermoformable synthetic cellular material" as the first layer of the body. The Rhodes patent does not show nor suggest the use of such material. In fact, the Examiner has admitted that such a structure is not shown, but has indicated that such a structure would have been "obvious" to one having ordinary skill in the art. Applicant respectfully disagrees with the Examiner's analysis as to "obviousness".

In the original specification for the present application, it was stated on page 5, lines 10 - 20 that:

It is constituted, for example, by thermoformable synthetic cellular material, in particular a thermoplastic or semi-thermoplastic

material such as polyolefins. It may be possible to take form of a foam.

By way of a non-limitative example, the material used to constitute the said formation and maintaining layer 8 has, for example a density of 10 to 100kg/m³, in particular approximately 50kg/m³.

Thus enables the risks of fragmentation of cover 1 under the thrust of retaining device 6 when it expands to be reduced.

It is also to be noted that the material chosen is capable, for example, of preserving its mechanical properties over a large range of temperatures, for example from -35 to +80°C.

Applicant respectfully contends that one having ordinary skill in the art of air bag covers would not have found the use of such materials to be "obvious" in order to achieve the properties of the present invention. There is certainly no teaching nor suggestion in the prior art Rhodes patent of these features that result from the use of such thermoformable synthetic cellular material. Applicant respectfully contends that since it is a principal feature of the present invention to provide an air bag cover which minimizes fragmentation, projectiles and other potentially injuring elements within the passenger compartment of a vehicle, the use of this material as the first layer of the body is important to the present invention and is not shown in the prior art.

IV. THE PRESENT INVENTION IS NON-OBVIOUS WITH RESPECT TO THE RHODES PATENT

Structurally, Applicant respectfully contends that the Rhodes patent does not show the "flap of flexible material integrally formed with an extending from one edge of the body". In the Rhodes patent, the flap of flexible material is not "integrally formed" with the body. Additionally, and furthermore, the flap of flexible material in the Rhode patent extends from a generally central

portion on the surface of the air bag cover and does not extend "from one edge of the body".

Additionally, the Rhodes patent does not suggest the use of the "thermoformable synthetic cellular material". As such, the Rhodes patent structurally lacks all of the elements of the present invention as defined by independent Claim 17 and 20.

Functionally, the flap is strongly and permanently affixed within the vehicle bodywork. In the present invention, the flap is integrally formed with the air bag cover and is not mechanically affixed by riveting thereto. In the Rhodes patent, the flap is riveted first to the outer skin of the cover and is also riveted to the instrument panel. As such, the present invention is functionally different from that of the Rhodes patent.

The results achieved by the present invention include the avoidance of projectiles within the passenger compartment of the vehicle, the re-usability of the air bag cover, and the avoidance of repair. In contrast, the Rhodes patent shows a structure similar to that of the previously recited prior art, in which the rivets are likely to tear from the outer skin of the air bag cover when the explosive force of the air bag is released. This tearing action can produce projectiles. Ultimately, any time the outer skin of the air bag cover is torn, re-use is prevented and replacement and repair are required. As such, the present invention achieves results which are neither suggested nor described in the prior art Rhodes patent.

V. SUMMARY

Based upon the foregoing analysis, it is Applicant's contention that the present invention is patentably distinguishable from the prior art reference. The elements of the present invention, as defined by independent Claims 17 and 20, are neither shown nor suggested by the prior art

Rhodes patent. One having ordinary skill in the art, having reviewed the prior art Rhodes patent, would not conclude that the integrally formed flap extending from the edge of the air bag cover would be obvious in view of the riveting connection of the air bag cover to the outer skin of the cover and to the vehicle framework. Applicant respectfully contends that the present invention, as claimed, is not obvious in view of the prior art reference. Additionally, those claims which are dependent upon independent Claims 17 and 20 should also be allowable over the prior art references.

The foregoing Brief is intended to assist the Board of Appeals in examining the application and, in the course of explanation, may employ shortened or more specific or variant descriptions of some of the claim language. Such descriptions are not intended to limit the scope of the claims; the actual claim language should be considered in each case. Furthermore, the remarks are not considered to be exhaustive of the facets of the invention which render it patentable, being only examples of certain advantageous features and differences which Applicants' attorney chooses to mention at this time.

Reconsideration of the application, as amended, and allowance hereof are respectfully requested.

Respectfully submitted,

Date 11.21.02

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: HERBAUT, Olivier

SERIAL NO.: 09/170,189

ART UNIT: 3618

FILED: October 13, 1998

EXAMINER: Fleming, F.

TITLE: AIR BAG COVER

EXHIBIT LIST

Exhibit A:

Copy of currently pending claims, Claims 17-22

Exhibit B:

U.S. Patent No. 5,161,819, issued on November 10, 1992, to Rhodes, Jr.



CLAIMS ON APPEAL

17. An air bag assembly for use in a vehicle comprising:
- an air bag which is capable of being inflated;
 - a vehicle bodywork;
 - a body having a first layer and a second layer, said first layer being of a thermoformable synthetic cellular material which rigidifies said body, said body having a first edge and a second edge;
 - a retaining means for permanently retaining said body to said vehicle bodywork, said retaining means comprising a flap of flexible material integrally formed with and extending from said first edge of said body, said flap being permanently affixed to said vehicle bodywork such that said body is in hinged relationship to said vehicle bodywork; and
 - a fixing means for releasably fixing said body to said vehicle bodywork, said fixing means for releasing from said vehicle bodywork when said air bag is inflated such that said air bag inflates without tearing said body or said flap of flexible material, said fixing means being secured to said second layer, said fixing means comprising a first strip of hook-and-loop material and a second strip of hook-and-loop material complementary to one another and detachably engaged with one another, one of said first and second strips being secured to said body, the other of said first and second strips being secured directly onto said vehicle bodywork.
18. The assembly of Claim 17, said body having an embellishment sheet extending over a surface of said first layer opposite said second layer.
19. The assembly of Claim 17, said fixing means being affixed adjacent said second edge of said body.

20. An air bag assembly for a vehicle comprising:



an air bag which is capable of being inflated;

a bodywork having a housing, said housing receiving said air bag therein; and

a cover means affixed to said bodywork and covering said air bag, said cover

means comprising a body having a flap of flexible material integrally formed with and extending from one edge of said body, said flap of flexible material permanently secured to said bodywork, said body having an opposite edge detachably secured to said bodywork, said body further comprising complementary strips of hook-and-loop material engaged together, one of said complementary strips being affixed to said body, the other of said complementary strips secured directly to said bodywork, said cover means for releasing from said housing when said air bag is inflated so as to release the inflated air bag from said housing without tearing either said body or said flap of flexible material.

21. The air bag assembly of Claim 20, said bodywork comprising a projection extending outwardly of said housing, said projection having one end affixed to said bodywork and another end adjacent said opposite edge of said body.

22. The air bag assembly of Claim 29, said body having a rounded portion at said opposite end, said rounded portion releasably received within a groove formed on said bodywork.



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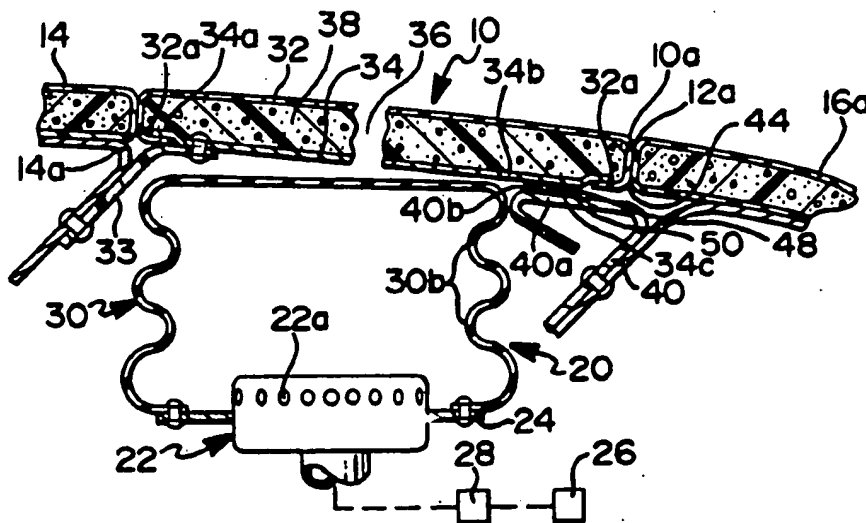
United States Patent [19][11] **Patent Number:** 5,161,819**Rhodes, Jr.**[45] **Date of Patent:** Nov. 10, 1992[54] **TAMPER PROOF AIR BAG DOOR**[75] **Inventor:** Richard D. Rhodes, Jr.,
Somersworth, N.H.[73] **Assignee:** Davidson Textron Inc., Dover, N.H.[21] **Appl. No.:** 691,237[22] **Filed:** Apr. 25, 1991[51] **Int. Cl.** B60R 21/16[52] **U.S. Cl.** 280/728; 280/743[58] **Field of Search** 280/732, 743, 728, 730,
280/731[56] **References Cited****U.S. PATENT DOCUMENTS**

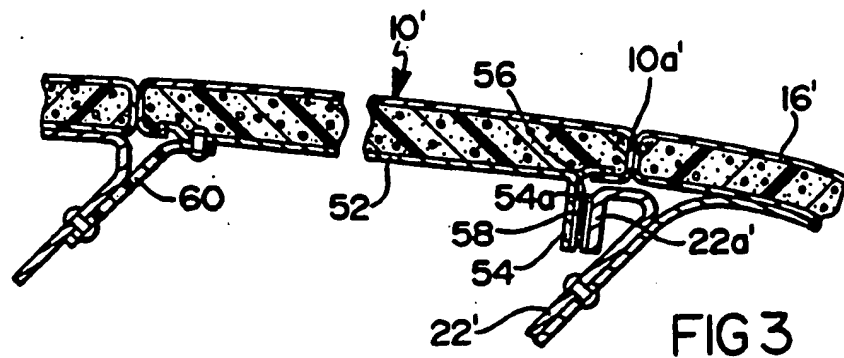
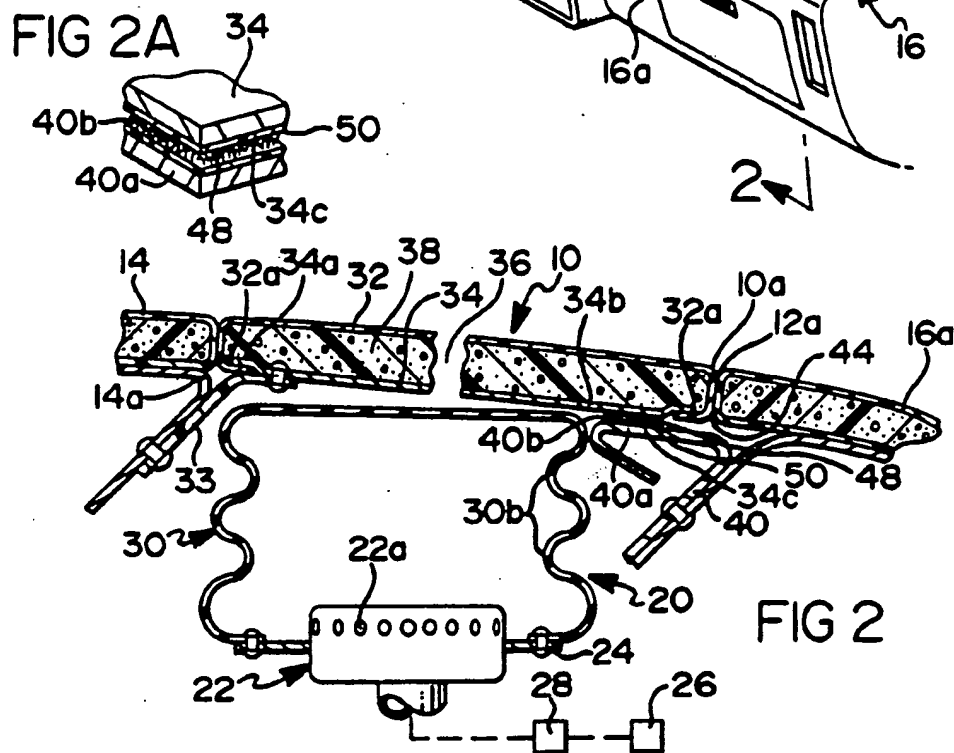
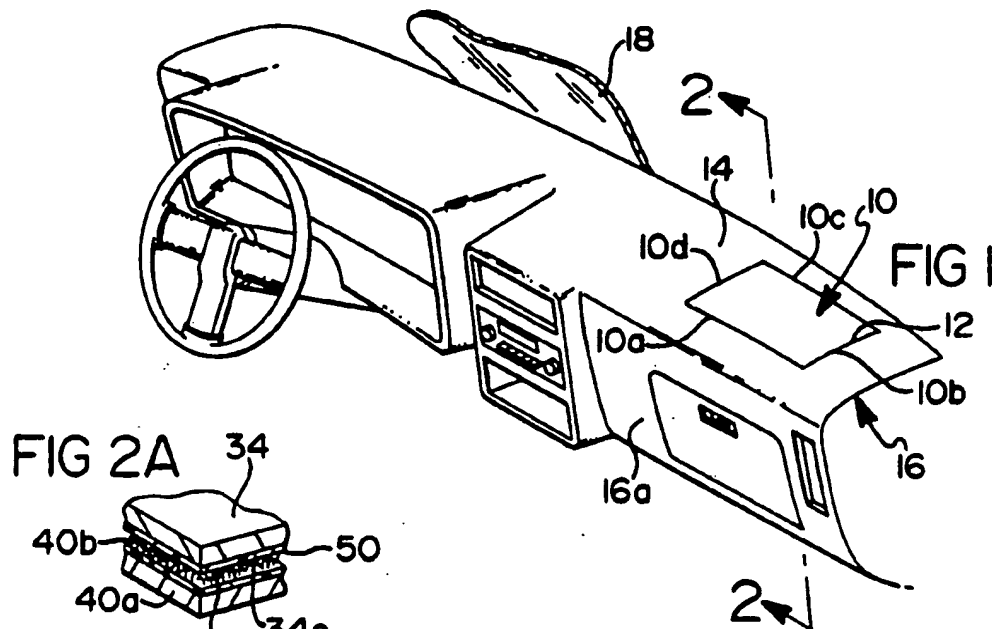
3,708,179	1/1973	Hulten	280/732
4,878,689	11/1989	Mitzkus et al.	280/743 X
4,893,833	1/1990	DiSalvo et al.	280/728 X
4,964,653	10/1990	Parker	280/732

Primary Examiner—David H. Bollinger
Attorney, Agent, or Firm—Reising, Ethington, Barnard,
Perry & Milton

[57] **ABSTRACT**

An interior trim product has an opening therein formed to overlie an air bag restraint assembly housed in the trim product. The air bag restraint assembly includes a canister for generating gas to inflate an air bag for deployment into the passenger compartment of a motor vehicle. The opening is closed by a door having a vinyl outer covering matching the aesthetic appearance of the outer surface of the interior trim product. First and second substrates formed in the interior trim product and on the door support two hook and loop fastener strips each of which is connected to one of the substrates to form a tamper proof connection for holding the door in place prior to air bag deployment.

4 Claims, 1 Drawing Sheet



TAMPER PROOF AIR BAG DOOR

FIELD OF THE INVENTION

This invention relates to air bag restraint systems for use in motor vehicles and more particularly to such air bag restraint systems which are housed within an interior trim product of the vehicle behind or below an opening which is closed by a door that opens when an air bag is inflated.

BACKGROUND OF THE INVENTION

Air bag restraint systems require a cover which opens to provide a path for deployment of an air bag into the passenger compartment as it is inflated.

Some of the prior art pads or covers for air bag devices are not soft and do not match or conform to the styling and aesthetic requirements of an associated interior trim product in which the air bag restraint system is housed. Such covers are often formed from injection molded thermoplastic elastomers or thermoplastic olefins. While such materials are suitable for mid-mount locations such as on the front vertical surface of an instrument panel, they do not perform well if subjected to radiant heating, e.g., sunlight directed through a front windshield of a vehicle.

Other prior art pads or covers include a foamed interior which provide a soft feel and an outer skin of cast plastisol, e.g., polyvinyl chloride (PVC) or urethane skin, ABS/PVC/nitrile tripolymer vacuum formable sheet, dry cast polymer skins, or injection molded PVC, which can be aesthetically matched to the material of the outer surface of an interior product which houses the air bag restraint system.

Examples of such prior art pads or covers are shown in U.S. Pat. No. 3,708,179 which discloses mid-mounted doors formed of a layer of urethane foam and an outer cover of a plastisol skin material. The '179 structure is supported on a pair of spaced hinge pins for movement outwardly of the front vertical face of an instrument panel so as to permit deployment of an air bag into the passenger compartment at the passenger side of the front seat.

U.S. Pat. Nos. 4,946,653 and 4,893,833 disclose door configurations for closing an upper mount configured air bag restraint system wherein the door is located in an upper surface of an instrument panel and moved upwardly toward the windshield of the vehicle when the air bag is deployed.

One problem with such prior art systems has been how to hold down the rear edge (from the in car position) of the door adjacent the rear edge of the deployment opening in the interior trim product. In the case of top doors, the rear edge is located at a point where children can pry the door open unless it is firmly fastened in place by interlocking mechanical members. One problem with such interlocking structure is that it may not allow for a prompt and repeatable release of the door when an air bag is inflated to impact against the underside of the door. In such cases, the access door may not fully open and thereby may hinder unobstructed deployment of the air bag into the passenger compartment of a vehicle.

SUMMARY OF THE INVENTION AND ADVANTAGES

The subject invention is directed toward a door assembly for an opening through which an inflatable re-

straint device such as an air bag is deployed following vehicle impact. The door includes an outer plastisol (or dry cast vinyl thermoplastic molded particles; urethane; or vacuum formed ABS/PVC) skin and a foam interior so that it will conform to the styling, feel and aesthetic appearance of an associated interior trim product which covers the air bag restraint system. First and second substrates respectively formed on the interior trim product and the door are located closely adjacent the rear end of the door. Two hook and loop fastener strips are provided on the first and second substrates to define a specified hold down force. The hold down force is maintained over periods of use and variations in temperature extremes so as to assure release of the door to provide unobstructed deployment of the air bag into a passenger compartment when vehicle impact causes a gas generator to inflate the air bag. Each of the fastener strips is connected to one of the substrates to form a tamper proof connection for holding the door in place in the deployment opening prior to air bag deployment. The fastener strips are arranged to either release in tension or shear to allow for unrestrained movement of the door into an upwardly pivoted position between a windshield and the passenger compartment of a vehicle when a vehicle impact causes the air bag to be inflated for deployment into the passenger compartment.

An object of the invention is to provide a door closure for an air bag restraint system which is easy to manufacture and which will reduce foam and vinyl stress and debris formation during air bag deployment and which will enable standard substrate configurations to be used in the foam molding manufacture while providing a hold down connection at the rear end of a door and the rear end of an access opening closed by the door which will release through a wide range of temperatures and following protracted periods of use. The hold down connection is configured for ease of assembly and is operative to maintain the door tamper proof.

A further object of the present invention is to provide a door assembly for closing an opening in an interior trim component of a vehicle in which an inflatable air bag assembly is housed for deployment of an inflated air bag into the passenger compartment upon vehicle impact. The interior trim component has an outer covering of cast vinyl material (or urethane or vacuum formed stock) around the opening with styling grains and colors for providing an aesthetic appearance and including a backing of soft foam material. A closure panel for the opening has an outer cover of cast vinyl material (or the aforesaid equivalents thereof) with styling grains and colors corresponding to the outer covering of the interior trim component; the closure panel has a shape corresponding to the opening in the interior trim component and is fit into the opening for closing the opening and for preventing access to the air bag assembly; the closure panel has a first substrate and the interior trim product has a second substrate, both substrates located closely adjacent the rear edge of the opening and the rear edge of the closure panel and including hook and loops fasteners that are operative to hold the door in place within the opening with the same hold down effectiveness over a wide range of temperature conditions and for extended periods of use; the fasteners release at a specified force level when an air bag is inflated against the underside of the closure panel so as to separate the closure panel from the interior trim product when the air bag is inflated and deployed

through the opening into the passenger compartment of a vehicle.

BRIEF DESCRIPTION OF THE DRAWINGS

Other advantages of the present invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIG. 1 is a perspective view of an instrument panel or dashboard which is one suitable interior trim product for housing and providing an opening for deployment of an inflatable restraint into the passenger compartment of a motor vehicle;

FIG. 2 is an enlarged sectional view of one embodiment of the invention taken along the line 2—2 of FIG. 1;

FIG. 2A is a broken fragmentary perspective view of a hook and loop fastener in the present invention; and

FIG. 3 is an enlarged sectional view like FIG. 1 but showing attachment of a door closure assembly to a canister.

DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

Referring now to FIG. 1, a door or closure panel 10 for closing an opening to an inflatable restraint safety device is shown. In this embodiment of the invention, the door 10 is shown in a top mount position in which it is located within an opening 12 formed through the top surface 14 of a dashboard or instrument panel 16. The opening 12 has a rear edge 12a located adjacent the rear surface 16a of the instrument panel 16. Opening 12 has a front edge 12b located in underlying relationship to a sloped front windshield 18. While shown in the upper surface of the instrument panel, the opening could also be formed in the rear surface 16a in what is known as a mid-mount position. The top mount or mid-mount of the door assembly 10 depends upon the location of the underlying air bag restraint system 20. In the illustrated embodiment of FIG. 1, the air bag restraint system 20 includes a gas generator 22 located in a canister or casing 24 mounted on a suitable vehicle component not shown. The gas generator 22 has a plurality of openings 22a through which a suitable inflatable gas flows when an impact sensor 26 is actuated upon vehicle impact to condition a controller 28 to initiate gas generation all as is well known to those skilled in the art. The inflatable gas is directed into the interior of an inflatable air bag 30 connected at one end 30a to the casing 24 and having convolutions 30b which expand as the air bag is inflated to impact against the underside of the door 10 to cause it to pivot upwardly toward the windshield 18 to allow for deployment of the air bag 30 through the opening 12.

In accordance with the invention, the door assembly includes a vinyl cover 32 which can be formed from cast vinyl material by processes such as those set forth in U.S. Pat. Nos. 4,664,864 and 4,784,911, both commonly assigned to the same assignee as in the present application and incorporated by reference herein. Such outer covers 32 have colors and grain appearances that are accurately matched to the appearance of the surface of an associated interior trim product such as the illustrated instrument panel. The vinyl outer cover 32 has edge portions 32a thereon formed over the peripheral edge 34a of a first construction substrate 34 of the type which is mounted on a lid of a foam mold

apparatus such as illustrated and described in U.S. Pat. No. 4,806,094, commonly assigned to the same assignee as the present invention and also incorporated by reference herein. In accordance with the present invention, the substrate 34 has construction holes 34b which aid in its connection to standard mold apparatus lids and which will enable it to be located so as to form a sealed connection with respect to the outer cover 32 and to define a space 36 into which foam precursors are directed in a known manner for reaction to form a soft feel foam layer 38 behind the cover 32 such that a finished appearance will be formed at side surfaces 10a-10d of the door 10 and the outer cover 32 will be supported by the foam layer 38 to match the styling and appearance of a foamed interior trim product. The side surfaces 10a-10d conform to the shape of the opening 12 so that the door 10 will closely fit in the opening 12 where it seats on suitable recessed support surfaces 14a in the top surface 14 of the instrument panel 16.

In accordance with one feature of the present invention, the first substrate 34 is associated with a second substrate 40 located on the interior trim product represented by the instrument panel 16. It should be understood that the invention is equally suitable for use with other interior trim products such as steering wheels having a housing formed hereon for housing an air bag assembly.

In the past, various mechanical interlocks have been proposed to hold a door assembly 10 within an opening for extended periods of time. Such mechanical interlocks have presented problems of how to hold the rear edge of the door closely within the interior trim product so as to hide access to the interlocks to prevent inadvertent or intentional tampering. Another problem is that the interconnection between the door assembly and the interior trim product requires precision alignment of the interlocking components. A disadvantage of such arrangements is that the position of the interlocking components can change at different temperatures because of differential thermal expansion between the mounts for the interlocking components. Such misalignment can change the release force required to open the door when an air bag is inflated. A tether 33 is secured between the front edge 10c and a retainer 14a on the instrument panel 16 to control upward pivotal movement of the door 10.

In accordance with the present invention, the first substrate 34 is a standard substrate used in forming a foam molded part having an outer vinyl skin. The substrate 34 has a surface 34c thereon defining a support surface located closely adjacent the rear edge of the door 10 immediately inboard of a breakline 44 formed between the underside of the rear edge 10a and the rear edge 12a at the rear 16a of the instrument panel 16. As shown in FIG. 2A, a first strip 48 of either hook or loop tear apart fastener sold under the trademark Velcro by Velcro U.S.A. Inc., Manchester, N.H., is bonded to the surface 34c to face downwardly therefrom. Such releasable tear apart fasteners are configured such that the release force can be controlled, either in tension or shear, by the interfacing area between the hook and loop components. Other equivalent type tear apart fasteners such as those with a pin and knob interface are equally suitable for use with the invention. The second substrate 40 has an inwardly directed flange 40a formed thereon defining a support surface 40b on which is connected a second strip 50 of a loop or hook fastener like that in the strip 48 but having the connecting features

thereon adapted to mate and fasten to those on the strip 48, e.g., when the strip 48 has loops the strip 50 has hooks and vice-versa. The fastener strips 48, 50 hold the rear edge 10a of the door assembly 10 against the upper edge 46 so that the breakline 44 is no more than a slight recess which remains almost hidden so that a child will not be able to pry the door upwardly. The retention force defined by the interconnected strips 48, 50 remains the same over a wide range of operating temperatures and the retention force therebetween remains the same (or improves when subject to vibration) for extended periods of time notwithstanding that the door assembly 10 and instrument panel 16 are subject to a wide range of forces and vibrations during use. Accordingly, a specified force required to release the door assembly 10 can be maintained at a predetermined interfacing connection area between the strips 48, 50. The selected interfacing area can be tailored to a particular interior trim product, canister and air bag design to assure that the door assembly will open at the specified force when the air bag is inflated thereby to assure quick and unobstructed deployment of the air bag into the passenger compartment. In the embodiment of FIG. 2, the release is by a tensile force which in certain applications would be in the order of 30 psi to provide a desired tamper proof hold down force for typical instrument panel applications of the type shown in FIG. 1 while providing desired door separation when the air bag 30 is inflated.

In the embodiment of FIG. 3, a shear force separation application is illustrated wherein a door assembly 10' has a construction substrate 52 with a dependent flange 54 located closely adjacent the rear edge 10a' of the door assembly 10'. The flange 54 defines a support surface 54a on which a hook or loop plastic fastener strip 56 is bonded. The flange 54 faces the inside upper edge 22a' of a canister 22'. The upper edge 22a' has a second hook or loop plastic fastener strip 58 bonded thereto and the strips 56 and 58 respectively have loops/hooks or the reverse which apply a force that will hold the rear end of the door assembly closely adjacent to or against the upper edge of the rear of the instrument panel 16' for purposes discussed in the description of the operation of the embodiment of FIG. 2. In this embodiment the release force is in shear in an instrument panel application as shown in FIG. 1, the shear force would be in the order of 100-150 psi which will provide a tamper proof retention force but which will be opened in the same manner as the first embodiment when an air bag is inflated to impact against the underside of the door assembly 10'. The impact will cause door separation when the air bag impacts on the underside of the door to allow the rear edge 10a of the door assembly to freely release from the instrument panel so that the door assembly 10 will quickly open by pivotal movement about a front hinge flange 60 connected to a retainer on the main pad of the instrument panel.

The door assembly of the subject invention thereby provides a soft skin door that is easily matched to adjacent interior trim products having foamed in place material and wherein the door assembly can be formed by standard foam molding apparatus without requiring special modifications to substrate components or without requiring modification of the lid for carrying such substrates during the foam molding of the door. A second substrate on the interior trim product and the door substrate are associated with a fastener construction which will separate without formation of debris during

door opening while provide a temperature and vibration insensitive hold down force so that the door is tamper proof while being easily and quickly released. While the invention is shown in association with a door mounted in a dashboard or instrument panel, it is equally suitable for use with other interior trim products such as driver side steering wheel housings. The arrangement is manufactured not only with standard equipment practicing standard processing steps, it enables the door to be used in a more cost effective manner than the assemblies in the prior art.

The invention has been described in an illustrative manner, and it is to be understood that the terminology which has been used is intended to be in the nature of words of description rather than of limitation.

Obviously, many modifications and variations of the present invention in light of the above teachings may be made. It is, therefore, to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. A door assembly for closing an opening in an interior trim component of a vehicle in which an inflatable air bag assembly is housed for deployment of an inflated air bag into the passenger compartment upon vehicle impact comprising:

said interior trim component having an outer covering around the opening having styling for providing an aesthetic appearance;

a closure panel having an outer cover with styling corresponding to the outer covering of said interior trim component; said closure panel having a shape corresponding to the opening in said interior trim component and being fit into said opening for closing the opening and for preventing access to said inflatable air bag assembly;

said closure panel having a substrate; said closure panel including a first component of a hook and loop tear away fastener thereon; and

a second substrate located at a rear end of said opening and a second component of said hook and loop tear away fastener thereon mating with said first component of said hook and loop tear away fastener for holding said closure panel against said interior trim component for preventing inadvertent tampering and separation of the closure panel from said opening prior to deployment of said air bag.

2. A door assembly for closing an opening having a rear end, and sides formed in an interior trim component of a vehicle in which an inflatable air bag assembly is housed for deployment of an inflated air bag into the passenger compartment upon vehicle impact comprising:

said interior trim component having an outer covering providing an aesthetic appearance;

a closure panel having an outer cover with an appearance corresponding to the outer covering of said interior trim component; said closure panel having a shape corresponding to the opening in said interior trim component and being fit into said opening for closing the opening and access to said inflatable air bag assembly;

said closure panel having a first substrate and including a depending flange portion thereon;

a second substrate located adjacent a rear end of said opening and a hook and loop tear away fastener; said hook and loop tear away fastener having first and second components connected respectively to

said first and second substrates adjacent said rear end of said opening for securing said closure panel within said access opening to prevent tempering and unauthorized access to the air bag assembly.

3. A door assembly for closing an opening having a rear edge, a front edge located adjacent a windshield and having side edges in an interior trim component of a vehicle in which an inflatable air bag assembly is housed for deployment of an inflated air bag into the passenger compartment upon vehicle impact comprising:

said interior trim component having an outer covering around the opening having styling for providing an aesthetic appearance;

a closure panel having an outer cover corresponding to the outer covering of said interior trim component; said closure panel having a shape corresponding to the opening in said interior trim component and being fit into said opening for closing the opening and for preventing access to said inflatable air bag assembly

said closure panel having and first and second substrates connected respectively to said closure panel and said interior trim component forming attachment surfaces closely adjacent the front edge of said access opening; and

hook and loop tear away fastener means connected between said attachment surfaces for holding a rear end of said closure panel within said interior trim component to prevent prying of said hook and loop tear away fastener means from exteriorly of said closure panel to assure that the access opening remains closed until said air bag is deployed; said hook and loop tear away fastener means arranged to separate in tension upon inflation of said air bag for separating said closure panel from said interior trim component at said rear edge of said opening when said air bag is inflated for causing said closure panel to pivot upwardly while providing for unobstructed deployment of an air bag through said opening into the passenger compartment of a vehicle.

cle between the windshield and an occupant of the vehicle.

4. A door assembly for closing an opening having a rear edge, a front edge located adjacent a windshield and having side edges in an interior trim component of a vehicle in which an inflatable air bag assembly is housed for deployment of an inflated air bag into the passenger compartment upon vehicle impact comprising:

said interior trim component having an outer covering around the opening for providing an aesthetic appearance;

a closure panel having an outer cover corresponding to the outer covering of said interior trim component; said closure panel having a shape corresponding to the opening in said interior trim component and being fit into said opening for closing the opening and for preventing access to said inflatable air bag assembly;

first and second substrates connected respectively to said closure panel and said interior trim component forming attachment surfaces closely adjacent the front edge of said access opening; and

hook and loop tear away fastener means connected between said attachment surfaces for holding a rear end of said closure panel within said interior trim component to prevent prying of said hook and loop tear away fastener means from exteriorly of said closure panel to assure that the access opening remains closed until said air bag is deployed; said hook and loop tear away fastener means arranged to separate in shear upon inflation of said air bag for separating said closure panel from said interior trim component at said rear edge of said opening when said air bag is inflated for causing said closure panel to pivot upwardly about said hinged connection to partially cover a windshield while providing for unobstructed deployment of an air bag through said opening into the passenger compartment of a vehicle between the windshield and an occupant on the passenger side of the vehicle.

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